

A Dravidian decipherment of Indus script

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5 Abstract

The Indus script writing system is described here as a logo-syllabic system with almost unique syllables associated with them. The crucial aspect of the decipherment is the observation that semantic value of numbers are not related to quantifiers but are used as adjectives such first/strong/mature etc., through the syllables that are derived out of it. The standalone semantic
10 values of the logo have crucial role to play in deciding the syllabic value of the logo, but it only uses the modified syllabic value in the instances of the text. Although main syllabic value is maintained around it's primary consonant value, the syllables have pluripotency both in terms of semantics and syllables in context, i.e., they have modified vowels and soft consonants (glides).

This decipherment is not only about syllabary, it also provides complete semantic decipherment as
15 well, uncovering various aspects of the life of Indus Valley Civilization. Most of the seals are about the barter trade transactions and describe from/to addresses, with mode-of-transport indicated in-between. The urn-symbol is deciphered as "ūr" (town/village) with various adjectives preceding it (or infused into the sign) describing the town. The unicorn-seal indicates that it is trade-related activity. The fish-signs and arrow signs describe the mode of transport of goods. The goods are
20 indicated by the object before the animal indicating whether it is a food-type or not (perishable goods or not). The decipherment also uncovers aspects other than trade, like marriage and disputes.

Prelims

We list a few acronyms/initialisms that is commonly used in the article:

- IVC : Indus Valley Civilization
- 25 DED: Dravidian Etymology Dictionary [1]
- M77: MASI 77, Mahadevan [2]
- WB: Wells, B., Indus Writing [3]
- MVB: M.V.Bhaskar [4]

DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. Here we use M77 to
30 denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. Mahadevan has simplified and reduced the number of signs, by considering many of them as variants of the same theme or treating them as identical. For a richer source of symbols and data, please refer to Wells [3] or the character list in NFM Indus Script font.

Introduction

35 Indus valley civilization was contemporary to other civilizations such as the Mesopotamia and Egyptian civilizations with it's own independent system of writing. Each of these systems had their

own culture and languages that were unique to their own civilization. It is a great challenge to decipher any one of them without a multilingual Rosetta stone, but such decipherments have been successfully achieved in the case of Linear Elamite [5]. In the case of Indus script it has been well established, through various indirect attempts, that it is closely related in cultural aspects with the ancient Dravidian culture and language. However, broad confusion arises when attempts are made to relate it to an alphabetic system as it seems similar to a complex logo-syllabic system like the Egyptian system of writing. There have been many futile attempts to conjure-up such a relation between the Tamil Brahmi writing system and the Indus script, despite of the fact that the Indus signs have strong pictorial content.

It took a while for the modern alphabets to arrive (around 1000 BCE) and one can expect that the logo-syllabic system of Indus script, like the earlier versions of Egyptian writing system, to be pre-alphabetic/abugida stage, where pure consonants have not yet been crystalized and extracted out of the spoken languages. From this decipherment it seems that the atomic units (signs) of the IVC writing system are logo-syllables, with the high potential for creating homophones, thus reducing the number of signs required for the orchestration of the writing system within the specific context of IVC society and it's trade transactions.

In this decipherment, the author followed the trail left by these signs (like a detective), as it uncovers through internal evidences tracing them one by one. Sometimes serendipity plays a big role in our findings, and all this would not have been possible but for the enormous sign lists and concordance data that has been gathered painstakingly by many reserachers over very many decades, making them freely accessible online. Of course, it also helps if your mother tongue has roots to the very same language and culture, although displaced in time by more than 5000 years!

In the next section we first outline the syllabary of Indus script as it is preceived here. Detailed list of all symbols and their syllabic values are described in a later section on "Syllabic development". After the next section on orthography we briefly describe the skilled artistry of Indus writing system, then the crucial role of Numbers, Clitics and the system of "Learning through pun". In the section after "Syllabic development" we describe a few frequent phrases that emerge out of the corpus with two or three logos. We then classify a few logos under functional ideographic categories (although they are primarily syllables they also have certain ideographic tendencies). Next we outline the crucial aspects of fish signs and their various manifestations. In the section after this we briefly sketch the dominant trade activities and their relative importance and it's implications in the development of a class society. We then go on to decipher several lines of text in the corpus and also seals containing interesting graphical content with their corresponding text in a "Show and tell" section. We end the body of the article with sections about "Overlap with previous work" and "Acknowledgements".

Orthography of the Indus script

The logo-syllabic syllabary of Indus will be described here as it is preceived here in use. We try to discern if there are broad rules of orthography in this writing system that we can observe. We will start with some simple number systems and see how they can prefix or suffix to other symbols/syllables in the system.

To begin with we use a simple rule that there is one and only one syllable to which each of these signs get assigned to. This is a simple rule to follow and it can be easily be discerned if it breaks. We will now describe the other patterns or rules that we observe.

- 80 Let us now consider the M77 sign-373 ○ to which we assign the syllable “pa” (from “pakaḷ”, meaning the sun or daylight). For the sign-86 | we assume that it has the value “mutaḷ” (the primary one) and then see how it applies to the sign-375 ⊙. We believe that this value is indicated by the sign-376 ∪ that has a tooth attached to it. So we have:

pa + mut-aḷ = paḷ

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Now let us consider the sign-391 ⊗, a sign that we know has strong correlations with elephant seals from MVB [4] findings, so we assign the value “paḷḷa” that also has close proximity to “paḷ”, but we can see there are three cross-lines and/or six small pieces, making it more like “pillir”. There is also another possibility that this is decided by DED 1045 ṁṭai/ṁṭa, a metal badge that is applied to the forehead of the elephant. So we observe that although broad rules are applied, there are also *ideosyncracies* of local culture that also provide a few interesting twists and turns, but in general it tries to confirm to some broad outlines.

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We will now move to the interesting sign-287), which we have assigned the value “valai/valai” after looking at it’s close cousins sign-298 ∟ and sign-290 𐌶 that has five strokes affixed to it’s top-right.

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∟ = 𐌶 =) + ∟∟∟ = vala + ai = valai

Doubling on that we get,

∟∟ = valai + ∟∟∟ = valai + ai = valaianjih or valaicci or valayacci

If sign-290 has three strokes on top we can get,

- 100 𐌶 = valai + ∟∟ = valai + mu = valaiyam

Semantically “vala/vala” is “right/curved” as the symbol right parenthesis and when combined with “5” (ai) it becomes valai.

- We also observed for M77 sign-62 (𐌶) that we can assign value “vālai” (scabbard fish that has sharp teeth). The sign-295 𐌶 “iru-valai” sounds similar to “ēri-vāḷai”. These signs also indicate that such deformation of the base syllable is possible, i.e., “valai” ≈ “vālai” and “ēri” ≈ “iru”. Of course, high homophony is one of the crucial principles in creating a script with minimal number of signs.

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Next, we look at sign-81 (𐌶) that we assign the value “valai-puri”, while we assign sign-63 (𐌶) the value “kanni-pori” (DED 1183, 4538, 4603). This then decides “kanni” for fish-sign and “puri” ≈ “pori” for bird (quail) sign.

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Based on these successes we decide to take a look on the other variants of fish-sign. For sign-70 𐌶 we apply “kāḷ” (DED 1483 assigns the semantic value of “cart”) and for sign-72 𐌶 “kōḷ” (DED 2238 assigns a semantic value of “raft/float”). One might ask why not assign the values the other way around, but the important clue comes from the cross-line that looks more like paddle/oar. Yes, again there are some *ideosyncracies* that comes with it.

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We now move to sign-328 \cup for which we assign the value “ū/u/va”. So for the sign-332:

$$\text{𑌵} = \cup + \text{𑌶} = \text{va} + \text{ai} = \text{vai}$$

Similarly we also get the very important sign-342:

$$\text{𑌷} = \cup + \text{𑌸} = \text{ū} + \text{iru} = \text{ūr}$$

120 Next, we get on to double affix, sign-336 \cup :

$$\text{𑌹} = \cup + \text{𑌺} + \text{𑌻} = \text{u} + \text{mu-ta-l} + \text{𑌻} = \text{uṭaṇ} \text{ (DED 945)}$$

Here sign-374 𑌻 takes the value “𑌻” (from droplet, “nīr”) and sign-336 \cup (uṭaṇ) has the ideographic association with mortar & pestle (a marriage ritual association as well)! In the M77 concordance list the sign-321 𑌾 is immediately preceded by sign-336 \cup . As the two sign-374 𑌻 are joined together by a string, a value of “ñāṇ” (DED 2908 “string”) will be the correct one:

$$\text{𑌾𑌹} = \text{uṭaṇ} + \text{ñāṇ} = \text{uṭaṇ-ñāṇ} \text{ (marriage agreement)}$$

Although the picture speaks thousand words there are also hints of syllables through micro-typography in Indus script. Consider sign-402:

$$\text{𑌼} = \text{𑌽} + \text{𑌺} = \text{na} + \text{ṭu} = \text{naṭu}$$

$$130 \text{ 𑌾} = \text{𑌶} + \text{𑌼} = \text{nāl} + \text{naṭu} = \text{nāṭu}$$

$$\text{𑌽} = \text{𑌺} + \text{𑌽} = \text{mutal} + \text{ni} = \text{maṇi}$$

$$\text{𑌽} = \text{𑌽} + \text{𑌺} = \text{ni} + \text{mutal} = \text{aṇiyal}$$

and now let us consider another sign-51:

$$\text{𑌾} = \text{𑌶} + \text{𑌸} + \text{𑌾} = \text{mu} + \text{iru} + \text{an} = \text{māran}$$

135 with an additional twist as “māran” twists and looks back (a feature observed by Mahadevan and passed-on through personal communications by MVB).

Of course, we can also say as additional double-emphasis things like:

iruvaṇi-māran-kuṛumpu

(true-path māran chief)

140 Now on to another topic:

M77 No.	Glyph	Roman	Tamil
169	𑌶	nilam	நிலம்
171	𑌶	nilai	நிலை
174	𑌶	iru-nēla	இருநெல்
88	𑌶	nal-iru	நல்-இரு

These are characters that seems to stand-out (pun intended with “nīl” being DED 3675 “to stand”), i.e., decided more by the context of IVC barter transactions and not by any complex orthography rules.

145 So as a broad outline we can say that the signs in IVC script are strongly associated with unique syllables and that the IVC writing system allows plenty of ways to mutate them in many ways from their base ideographic glyph values. However, it is not clear that in the case when there are multiple affixes applied, then which comes first, i.e., whether a base glyph applies first etc. In general one could assume it flows from right-to-left and top-to-bottom, but I suppose there are many exceptions
150 that are decided by the context.

For example the famous sign-116 '𑀓𑀔' can take the value “nellai/nallai” but the other-way around can also be “ayaḷ” is quite unlikely in the IVC transaction context. Sign-112 '𑀓' works as “munṇāḷ” but in the semantics of IVC transactions “ṇāḷam” works better. Of course, both are possible and even within the context of IVC “munṇāḷ” might be a better choice in some particular
155 case.

The non-affixed pure IVC signs have unique syllables associated with them, which have either single consonant and two consonants at the most. The combining rules usually seem to drop the middle consonants, and of course the vowels are modified as pertinent to the situation.

In some cases the components may not be a disjoint merger but a continuous merger (welding) of
160 the two as in this case:

𑀔𑀓 = 𑀔 + 𑀓

taṛi = tan + vaṛi

Finally as an interesting remark I would like to bring to attention a nice little sign-310 𑀓 with a probable value of “vilaviḷa” (DED 5424)

165 𑀓 = 𑀓 + 𑀓 = vil + vil = vilaviḷa

that sounds similar to “vavvāḷ” (long-tailed fruit bat?) as used in this line of text:

𑀓 𑀓 𑀓 𑀓 𑀓

Trembling with fear “vilaviḷa” cognates well with “eerie bat”, so we try to decipher this line.

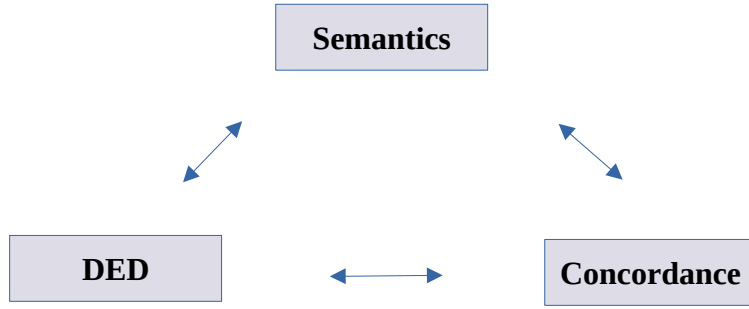
170 Vilamban trembling with fear “loading” (māṭṭu, 𑀓) the bow, but what’s to the right of vilamban, a tiger? Tiger trembling or the hunter trembling? So we notice that it could be:

ciruttai = cīpu + iru-tai = 𑀓 + 𑀓 (right-to-left) = 𑀓

This describes the process of discovery through an example. As a broader generalization we could insist for Dravidian decipherment that the following triangle commute (i.e., more like walking on three legs or squash on three walls):

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We illustrate this with a line of text:

⌈ ⌘)) ⌘

185 valan.ai-iru.valai-varvan.ūr-anjih

To fit it into the context we need to modify this to:

valamai-iru.vilai-vuṛavan.ūr-anjih

வளமை இருவிளை உழவனார் வஞ்சி

Semantics:

190 Fertile highly productive farmer's town paddy

or

Fertile double-crop farmer's town paddy

We now show how consonants and vowels express themselves in this system, but since it is not an alphabetic system, they don't carry any special importance by themselves as there are many more syllables with single and double consonants that are used to complete the language.

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Consonants and their signs

Consonant	M77 sign	Glyph	Roman	Tamil
ka (க)	59	⌘	kaṇṇi	கண்ணி
ce (சே)	76	⌘	cēval	சேவல்
ta (த)	216	⌘	tanṭi	தண்டி
pa (ப)	373	○	pakal	பகல்
pu (பு)	78	⌘	pūr	பூர்
pū (பூ)	54	⌘	pū	பூ
ma (ம)	242	⌘	māṭi, māṭu	மாடி, மாடு
mē (மே)	197	⌘	mēl	மேல்
mu (மு)	86	|	mu	மு, முதல்
mū (மூ)	89	|||	mū	மூ, மூணு
na (ன)	374	⌘	na	ன
nā (நா)	95	|||	nāl	நால்
r (ர)	87	||	ranṭu	ரண்டு
va (வ)	328	U	va	வ

Consonant	M77 sign	Glyph	Roman	Tamil
ra (ர)	400	𑌕	ra	ருழ
ru (ரு)	110	𑌕𑌕𑌕𑌕	ru	ரு

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Although vowels and glides can be arbitrarily mutated, modified or introduced in to the system while combining with the base syllable, the vowels are very much required at the beginning of a word. We list a few here.

Vowels and their signs

Vowel	M77 sign	Glyph	Roman	Tamil
an (அ)	1	𑌕	an	-அன்
āṭu (ஆ)	50	𑌕𑌕	āṭu	ஆத்து ஆடு
ila (இ)	323	𑌕	ila	இல
ūr (ஊ)	342	𑌕	ūr	ஊர்
eṟu (ஏ)	110	𑌕𑌕𑌕𑌕	eṟu	ஏழு

Skilled artistry of Indus script

At the core of Indus script lies the mastery of a skilled metallurgist (𑌕). We will illustrate this with these with few examples:

𑌕𑌕𑌕 = 𑌕𑌕𑌕 = vēl-aṇi-nuṛan-ūr = வேல்அணிநுழனூர்

The semantic meaning being the town with tailors, jewellery and hunting professions.

𑌕 = | 𑌕 𑌕 || 𑌕 = mu-iru-mēl-pēr-ul = மூவிரு மேல்பொருள்

In this case the semantic meaning could be the mighty great guardian of the township (elevated to kings and gods at later times).

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Some important townships

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This is just indicative of the various kinds of townships and professions, and a deeper quantitative study is required to obtain their relative importance. What is interesting is that the last one in the list is farmer's town, which doesn't count really as a town, but in Dravidian languages, the term "ūr" seems to cover what we call "village" also. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. For a richer source of symbols and data, please refer to Wells [3]. Some of these signs here have been identified earlier by other authors, so a proper acknowledgment of these facts will be added later on in a separate section.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
342	𑌕	ūr	752	town	ஊர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
347	𑌵𑌵	velūr	-	hunter's town	வேலூர்
358	𑌵𑌶	chevūr	-	bronze worker town	செவ்வூர்
351	𑌵𑌶𑌶	vel-nuṛan-ūr	-	hunter-cloth worker town	வேல்நுழுவூர்
?	𑌵𑌶𑌶	che-palla-ūr	-	bronze-elephant worker town	செவப்பல்லூர்
355	𑌵𑌶𑌶	vel-palla-ūr	-	hunter-elephant worker town	வேப்பல்லூர்
361	𑌵𑌶𑌶	che-ko-ūr	-	herder-bronze worker town	செங்கோவூர்
372	𑌵𑌶𑌶	vel-aṇi-nuṛan-ūr	-	hunter-jeweller-tailor town	வேல்அணிநுழனூர்
15	𑌵𑌶	uṛavūr	688	working, farming town	உழவூர்

Numbers

- 215 Numbers are treated separately, but they are just like other glyphs, easily welded and affixed to other glyphs, producing a plethora of possibilities. However, they are an important pointer to the fact that the actual standalone semantic value (in this case the numeric number) of the glyphs may have very little to do with it's semantic value.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
86	𑌵	mutal, -al	4950	one, primary	முதல், -ல்
87	𑌵𑌵	-ar, -ir, iru-	474, 481	two, great, eminence	ரண்டு, -இர், -ர், இரு-
89	𑌵𑌵𑌵	mū-, mūn-	5052	three	மூ-, மூன்-
95	𑌵𑌵𑌵𑌵	nal-, -nāl, nalla-	2912	four, good	நல்-, -நால், நல்ல-
96	𑌵𑌵𑌵𑌵𑌵	-ai	2826	five, unity	-ஐ
108	𑌵𑌵𑌵𑌵𑌵𑌵	aru-, -ar	2485	six, river, fort	ஆறு, அறு
110	𑌵𑌵𑌵𑌵𑌵𑌵𑌵	eṛu-, -eṛu	910	seven, rise, fertile	ஏழு, -எழு
Application of above phonemes					
112	𑌵𑌵𑌵𑌵	nalām, nālam, munnāl	2913	land, healthy, before	நலம், நாலம், முன்னால்
116	𑌵𑌵𑌵𑌵𑌵	nallai, nellai	-	rice	நல்லை, நெல்லை
121	𑌵𑌵𑌵𑌵𑌵𑌵	nal.nel.āl	-	good rice person	நல்நெல்லாள்
120	𑌵𑌵𑌵𑌵	mu-munamum	-	three generations back	மும்முன்னோனும், மும்முன்னமும்
119	𑌵𑌵𑌵𑌵	mu-munnor	-	two generations	மும்முன்னோர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				back	
107	'''	mūri, mūrā	5041	bullock, buffalo	மூரி, மூரா
177	𑌦	nal-mutal, nalāl	-	good chief, good worker, hard worker	நல்முதல், நல்லாள்

Clitics

- 220 Clitics provide sentence structure (the subject and the object). The default reading order is right to left, but before the clitic 𑌦 (sign 99), the reading is supposed to be left to right (but this doesn't seem to be followed strictly by writers of IVC script).

M77 No.	Glyph	Syllable	Tamil
97	𑌦	-il, -da, -ta, -in	-ட, -டு, -த, -து -இல், -இன்
99	𑌦	-ra, -ru	-ர, -ரு, -ற, -று
123	𑌦	-yar, -yin	-யர், -யார்
344	𑌦	ūr-ār	ஊரார்
343	𑌦	ūr-il	ஊரில்

- 225 The Indus writing is not without it's own inaccuracies, either by themselves or captured by mistake by the scribes. We noticed a few cases where the clitic sign-99 𑌦 has been captured as sign-87 𑌦, which in those particular instances seem more like a case of sign-99 rather than sign-87. However, it must be mentioned that there are very few mistakes in the Mahadevan's corpus (both in intent and purpose), which has done a nice balancing act between variety and simplicity, thus making it easier for decipherment. For a slightly different opinion from Mahadevan on the list of signs is Wells [3].
- 230 We follow Mahadevan's sign list and numbers here, but it must be possible to do it using Wells [3] list of signs and sign-number as well without any loss of generality.

Learn through pun

- 235 Following are an indication of the pun that abounds in Indus script, which is termed as the "rebus principle". Of course, it only makes sense if your language is close to ancient Dravidian. For deeper understanding you may have to refer to some of the sign values below this in the section on "Syllabic development". We only sketch a few, but the Indus script syllabary abounds in such pun. The reduction of number of glyphs required for a writing system for Dravidian language is very much dependent on prudently choosing glyphs that provide highest possible homophony.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
298	𑌦𑌦𑌦𑌦	valai = vala+ai	5267, 5288	) = vala+5	வல+ஐ=வலை
	Right-parenthesis is "vala" (curved as well as right) in Tamil and "vala" + "ai" = "valai". "vala" is curve, as well as "right", which fits well with description of right parenthesis. Also, 𑌦𑌦𑌦𑌦 can be further expanded as "valaicci" or "valayacci" or "valayanjih".				
62	𑌦𑌦	valai-kanni	5379	scabbard fish	வாளை கன்னி

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				with fang-like teeth	(மீன்)
	The fish “vālai” is known as the scabbard fish that has sharp teeth. A nice tooth is drawn at the top to elucidate the learning. This explains that the right-parenthesis sign-287 carry the phonetic value “valai”				
295	))	eri-valai	902	Another sharp tooth fish	ஏரி வாளை (மீன்)
	A fresh water shark, Wallago attu , also known “eri-valai”, a pun again on the word with rebus equation: “vālai” ≈ “valai”. The prefix “eri” comes from “two” or “iru”, leading to one more rebus equation: “iru” ≈ “eri”.				
63	(#)	kanni-pori-valai	-	Trapping of birds	கன்னி-பொறி-வலை
	This learning tablet defines the phonetic value of fish as “kanni” and the bird as “puri” by defining it through a polysyllabic pun as “kanni-pori” with a parenthetic “valai”. The “kanni-pori” in Tamil is “trapping”.				
64	)(	valai-kanni	-	The clitic reverses reading order	கன்னி-பொறி-வலை
	The clitic sign 64 reverses the reading order to the right of it. This learning script defines that.				
376	∩	pal	-	teeth	பல்லு
	A teeth is indicated by the protruding teeth effect, just like in the fish teeth.				
57	⚡	irumpu	486	iron	இரும்பு
	Now we have triple pun: iru-pu (two insects) ≈ erumpu (ant) ≈ irumpu (iron)				
181	🐝	kottu	2065, 2064	pour (sting)	கொட்டு
	We can see pincler claws are indicated to show “sting” and “pour” are homophones in Dravidian “kottu”. The stinging honey-bee also is supposed elucidate connotations of “honey” that pours (kottu) from the beehive.				
310	🦋	vila-vila	5424	tremble with fear	விலவில
	This cognates with “vavvāl” (DED 5370), probably a long-tailed fruit bat, with an eerie shivering scene that it creates.				
303	) (	iṭa	432	cleft, gap, split, crack open , slit, breach, chasm	இட
	Also works as “iṭaveli” ≈ “iṭai-valai”.				

Signs and affixes

240 Just to give a flavor of the decipherment here we group few signs under base/affix geometry. In some cases there could be more than one affix. For more details see next section “Syllabic development”.

Sign ○

Affix Base	|	||	|||	||||	|||||	Ψ	○	◊	○ |	⋈	||| - ||
○	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
pa	pal	para	pammu	nal- para	pallā	vel-appa	pān	cirapp u	pānal	pān-an	nal-pallar
பா	பல்	பற	பம்மு	நல்பற	பல்லா	வெல-ப்பா	பாண்	சிறப்பு	பானல்	பானன்	நல்பல்லர்

Sign U

Affix Base	|	||	|||	||||	| ○	| ○ ||||	Ψ ||	- ||	⋈ Ψ
U	U	U	U	U	U	U	U	U	U
ū	vaḷ	ūr	ūm	vai	uṭaṇ	uṭai	velūr	chevūr	vel-aṇi-nuṇan-ūr
ஊ	வள்	ஊர்	உம்	வை	உடன்	உடை	வேலூர்	செவ்வூர்	வேலணிநுழனூர்

245

Sign ✕

Affix Base	|	| ○	||||	||	⋈	||| ||	⋈	-	⋈
✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
ta	taḷ	tan	tai	irutai	ciruttai	mumutai	tāṇi	toṭu	tan
த	தள்	தன்	தை	இருதை	சிறுத்தை	மும்முதை	தாழி	தொடு	தன்

Sign ✧

Affix Base	|	|	^	^	||	|||
✧	✧	✧	✧	✧	✧	✧
kanni	kāl	kōl	peru-kanni	peru-kaṇai	kōnda, gōnde	kanāl
கன்னி	கால்	கோல்	பெருங்கன்னி	பெருங்கணை	கொண்ட, கோண்டே	காணல்

Sign 𑌀

Affix \ Base	|	||	| - |	𑌀	-	^	|	||| - |
Base	𑌀	𑌁	𑌂𑌃	|𑌄|	𑌅	𑌆	𑌇	𑌈𑌉
an	āl	aṇṇan	kāvalan	naṭṭan	uṛavan	kīrrān	mutalvan	nal-mutalvan
அன்	ஆள்	அண்ணன்	காவலன்	நாட்டான்	உழவன்	கீழன்	முதல்வன்	நல்முதல்வன்

Sign 𑌊

Affix \ Base	𑌊	||||	|||	𑌊	𑌊	𑌊	𑌊
Base	𑌊	𑌋	𑌌	𑌍	𑌎	𑌏	𑌐
kō	kōṭṭa, kōṭu	kōṭai	kōṭṭam	nāl-vari-kōṭai	nērcira-kō	pallar-kōṭṭa	kōṭai-vari
கோ	கோட்ட, கொட்டு	கோட்டை	கோட்டம்	நல்வழி-கோட்டை	நேர்சிற-கோ	பல்லர் கோட்டை	கோட்டை வழி

250

Sign 𑌌

Affix \ Base	180°	𑌌	𑌌 180°	- 180°	90°	270°	||
Base	)	(	)	(	𑌌	𑌌))
valai	iṭai	valaiyan	iṭaiyan	iṭa	kuṭa, kuṭai	ū	iru-valai
வலை	இடை	வலையன்	இடையன்	இட	குடை	ஊ	இருவிளை

Sign 𑌎

Affix \ Base	|	|	||	||	|||	|	𑌎 | 𑌎	|	𑌎
Base	𑌎	𑌏	𑌐	𑌑	𑌒	𑌓	𑌔	𑌕	𑌖
-n	nāṭu	aṇiyal, maṇi	ñāṇ	nan	nannu, nannan	nalnelāl	nuṛan	nan-mutal	nāṇkuru
ன்	நாடு	அணியல், மணி	நாண்	-னன்	நன்னு, நன்னன்	நல்நெல் லாள்	நுழன்	நன்முதல்	நன்குழு

Syllabic development

We outline from top to bottom how the syllabary is slowly developed from simple to complex glyphs. Happy journey!

M77 Sign	Glyph	Syllable	DED	Description	Tamil
1	𐀀	an	131, 132	person	அன்
	𐀁	an(n)-an	131, 132	brother	அண்ணன்
2	𐀂	kāvalan	1417, 1416	security guard	காவலன்
25	𐀃	mutalvan	4950	chief	முதல்வன்
26	𐀄	nal-mutalvan	-	good chief	நல்முதல்வன்
3	𐀅	aṇṇal, āḷ	110, 399	great man, servant, slave, soldier, messenger	அண்ணல், ஆள்
4	𐀆	natt-an	3638	country man	நாட்டான்
5	𐀇	natt-ar-an	3638	country rules	நாட்டாரன்
6	𐀈	aṇ	2115	clever man	கொம்பன்
7	𐀉	val(i)-an	5276	skilled man	வலியன்
162	𐀊	vēḷ, vēl	5545, 5536	chief, spear, trident	வேல்
8	𐀋	vēlan, vēṭan	5545, 5368, 5527	chief, lance fighter, hunter	வேலன், வேடன்
9	𐀌	valai-vēlan, valaiyan	5288	animal trapper	வலையன்
12	𐀍	uṛavan	688	farmer	உழவன்
13	𐀎	uṛavāl	688	farm worker	உழவாள்
14	𐀏	pēr-uṛavan	688	big farmer	பேர் உழவன்
15	𐀐	uṛavūr	688	working, farming town	உழவூர்
37	𐀑	valaiyan	5288	Trapper, fisherman	வலையன்
41	𐀒	kīṛān	1621	poor	கீழான்
42	𐀓	pallan	3986a	mahout	பல்ல(வ)ன்
54	𐀔	pu	4345	flower, insect, flourish, bloom, create	பூ (பூச்சி)
55	𐀕	pol	4550	flowering, flourishing, blooming, creating	பொலி, பொலிவு
374	𐀖	-n	1159b, 3621,	night, bug	நீர் (துளி), (ப)னி, நள்,

M77 Sign	Glyph	Syllable	DED	Description	Tamil
			3621a		நல்லு
410	𑌕	ñāṇ, nān	2908, 3639	string, me	நாண், நான்
415	𑌖	nānnan	2908, 3639	twiner	நாணன்
417	𑌗	nalnelāl	-	good farmer	நல்நெல்லாள்
412	𑌘	nāṇkuṛu	2906	earthworm	நாண்குழு
186	𑌙	kūṛu, kuru	1924, 1921, 1782	section/ division/share, to proclaim, brilliant	கூறு
299	𑌚	ida, idai	449	hip, left	இட-, இடை
301	𑌛	idayan	450	herder, herdsman	இடையன்
287	𑌜	vala-, vaḷai	5313, 5314, 5288	bent, trap, right, net	வல, வள, வலை, வளை
298	𑌝	valaicci, valaiyacci	5288	surround, trap, hunter	வளைச்சி, வலையச்சி
293	𑌞	valaiyan	5288	animal trapper (short form)	வலை வேலன், வலையன்
303	𑌟	iṭa, iṭavai	432, 434	narrow way	இட, இடவை
187	𑌠	kutai-kuru	1714	notch at end of bow	குதைகூரு
312	𑌡	kuṭi, kuṭai	1655, 1660	house, family, lineage, hollow, cavity, penetrate	குடி, குடை
313	𑌢	kuṭir	1655	house, family	குடிர்
314	𑌣	kuṭima	1655	house, family	குடிம
315	𑌤	kuṭi-ēru	1655	immigration	குடிஏறு
393	𑌥	pallar-kuṭi	1655	mahout hamlet	பல்லர்குடி
328	𑌦	vu	651, 761	ooze, mortar	வ, உ, ஊ
?	𑌧	vala, vala	5304	strong, fertile	வல-, வள-
32	𑌨	uvan		person between two	உவன்
330	𑌩	mūr	5046	mature, ripe	மூழ்
332	𑌪	vai	5549-53	to stay, straw of paddy, to abuse, sharp	வை
336	𑌫	uṭaṇ, valaṇ	945	with, consent, immediately	உடன், வலண்
337	𑌬	uṭai	593	wealthy	உடை
342	𑌭	ūr (ural, uṛi)	752 (651, 708)	town, village	ஊர் (உரல், உறி)
347	𑌮	vēlūr	-	hunter's town	வேலூர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
358	𑌵	cevūr	-	bronze worker's town	செவ்வூர்
344	𑌶	ūr-ar	-	important sign with clitics	ஊரார்
343	𑌷	ūr-il	-	important sign with clitics	ஊரில்
373	𑌸	pa	3805, 4016, 4124, 3884	sun, pot	பகல், பள்ளம், பாணை, பண்
375	𑌹	pal, pala	3986a	teeth, many	பல், பல
386	𑌺	poli, poḷi	4550, 4560	prosperous, chisel	பொலி, பொளி
379	𑌻	pammu, pollam	3934, 4554	to baste, to yarn, stitch, joining	பம்மல், பொல்லம்
391	𑌼	pallā	3986a, 1045	elephant	பல்லா (யானை)
Depicted by the ornamental oval-shaped plate that is fixed on it's forehead					
392	𑌽	nal-pallar (nalla-palla-iru)	-	good mahout	நல் பல்லர்
403	𑌾	parai, parru	4031, 4032, 4034	announcement (sale) with a drum beat	பறை, பற்று
407	𑌿	pulam	4303	arable land	புலம்
406	𑍀	paḷapaḷa	4012	glittering, well-oiled	பளப்பள
404	𑍁	nal-parai		good announcement	நல்ல பறை
387	𑍂	vēlappa		worker, hunter	வேலப்பன்
389	𑍃	pañ-nilam	3837	ploughed land	பண்ணிலம்
254	𑍄	paṭi, paṭṭi	3848, 3850, 3868	hamlet, village, settlement, rest, roost, step gradee, rank	படி, பட்டி
216	𑍅	ta (tandi, tondi, tavalai)	2946, 3110, 3549	earthen pot	தண்டி, தோண்டி, தவளை
217	𑍆	toṭal, todu, toṭu	3480, 3482	touch, begin, join, to wear, dress-up	தொடல், தொடு
53	𑍇	tāvu	3177	jump, luxuriant, tread gently	தாவு, தவளை
222	𑍈	tal, tol	3123, 3105, 3516	obstruct, stop beat, crush, old, ancient	தள், தொள்
223	𑍉	mumuta	-	grand-parent	மும்முத
229	𑍊	taṛ, tāṛi	3178	bow down	தாழு, தாழி
36	𑍋	tānan-	3045	cold, water	தண் (தண்ணீர்)
?	𑍌	pān	4068	song, melody	பாண்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
396		pāṇal	4071	rice-field	பாணல்
31		pāṇan	4068	tamil bard	பாணன், பாடுபவன்
59		kaṇ, kanni	1159a, 1166, 1168, 1417, 1483	bamboo raft, trap, trapper	கண், கன்னி
60		nalla-kanni	-	good vehicle, good trapper	நல்ல கன்னி
67		kondū, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட
72		kōl	2238	boat, raft	கோல்
70		kāl	1483	cart	கால்
65		peru-kanni		big boat, big cart	பெருங்கன்னி
75		peru-kaṇai	1404	intense, abundance	பெருங்கனாய்
69		kaṇṇal	1305, 1415	vessel, ship	கண்ணல்
66		nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
66		nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
58		muttu	4959, 4932, 4957	pearl, excellent, praiseworthy	முத்து
78		pori, puri, purā, pura, pūr	4286, 4334, 4374, 4603	courage, pride, chicken, pigeon, dove, quail, pheasant	புரி, பொரி, புறா,
77		paraṇ-	4020	bird farming, sustainer	பரண்- (பறந்தூர்)
79		cuṭṭi-paraṇ	2655-4020	crested pheasant	சுட்டி பரண்- (பறந்தூர்)
80		paraparaṇ	3949	bird farming, pigeon messenger?	பறப்பரன்
81		valai-pori	-	trapping bird	வலைபொரி
319		muri, muṛi	4977, 5010, 5008	twist, twine, tender leaf, shoot, sprout, break, perish	முரி, முறி, முருக்கு
134		peru, pār	4411	big, large	பெரு, பேர்-
204		perum	-	large	பெரும்
209		peru-mutal	-	large primary	பெருமுதல்
210		perum-mutal	-	large primary	பெரும்முதல்
206		mu-perum		mature large	முப்பெரும்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				primary	
205	𐌂	nāl-kompu, nāmpu	2115, 3649	good clever, sprout of millet	நால்கொம்பு, நாம்பு
261	◇	kō	2177, 2178	mountain, gentry	கோ, கோட்டை
Origin of the word “kō” could be the Gond people (gōnde, DED 2216) of the mountains, reinforced by the West wind, from western practice of having kings in Sumeria					
30	𐌋	kōvan		herder, herdsman, gentry	கோவன்
Cattle class that eventually becomes the ruling gentry					
267	◇	kōṭṭa, kōṭu	2207, 2053, 2203, 2200	gift, munificence, fort, gentry (west wind, western practice of having kings in Sumeria), horn	கொட, கொட்ட, கொடு, கொம்பன்
272	𐌊	kōṭai, kōṭai	2207, 2049	fort, gift	கோட்டை
271	𐌋	kōṭṭam	2058	cattle-shed	கோட்டம்
244	𐌀	aru, ārru, arai, aran	317, 407, 322, 201	strong, dwellment, camp, room, castle	அறு, ஆறு, அறை, அரண்
242	𐌁	māṭi, māṭu	4796a, 4798	mansion, terrace, ox	மாடி, மாடு
197	𐌃	mē, mēṭu, mettai	5086, 5058, 5069	top, terrace	மேல், மெத்தை
198	𐌄	mē-mu	5086	higher maturity	மேழு
199	𐌅	mē-vēl	5086	excellent hunter	மேவேல்
200	𐌆	nal-mē	5086	good excellence	நல்மே
402	𐌇	nāṭu	3638	country (as a contrast to forest)	நாடு
245	𐌈	taṭṭi, taṭṭu, taṭṭān	3036, 3039	cloth, wooden frame, hammer, tap	தட்டி, தட்டு, தட்டான்
296	𐌉	vaṛi	5297	way	வழி
149	𐌊	nālvaṛi	5297	cross-road	நால்வழி
297	𐌋	aruvaṛi	5297	six-way crossing	அறுவழி, ஆறுவழி
135	𐌌	peruvaṛi	5297	big way	பெருவழி

M77 Sign	Glyph	Syllable	DED	Description	Tamil
136	𑌕	aim perumvaṛi	5297	five big way	ஐம் பெருவழி
153	↑	poruḷ, poṛal, poṛil	4544, 4555, 4558	object/goods, town, earth/country/district	பொருள், பொறல், பொறில்
155	†	ampi	177	boat, raft, ship	அம்பி
211	↑	anuppu (ampu)	329 (178)	send	அனுப்பு, அன்பு
83	𑌕	iṛakkam, iṛappu, iṛakkam, iṛappu	501, 514	death	இழக்கம், இழப்பு, இறக்கம், இறப்பு
50	𑌕	āṭu	5152	goat	ஆத்து, ஆடு
124	𑌕	ēr	2815	plough	ஏர்
125	𑌕	eru	863	full, strong	எறு
126	𑌕	cēr	2814	join, unite, mingle	சேர்
161	𑌕	vilaku	5423	diverge	விலகு
137	𑌕	cēri	2007	village street, assemblage, hamlet	சேரி
138	𑌕	perum-cēri	207	big assemblage	பெரும் சேரி
139	𑌕	mēl-cēri	207	high assemblage	மேல் சேரி
140	𑌕	nal-iru-cēri	-	good, strong assemblage	நல்லிருச்சேரி
141	𑌕	cēri-vaṛi	-	road to assemblage	சேரிவழி
142	𑌕	cēri-vaṛi-anjih		road to assemblage resting place	சேரிவழிவஞ்சி
47	𑌕	arana, araṇai	203, 204	gift, squink, law-abiding, just	அறண், அரணை
48	𑌕	nal-aran, aran-nal-	-	good behavior, good gifter	நல் அறண், அறநல்-
113	(𑌕)	viḷai-ñālam	5437, 2913	fertile land	விளை நாலம்
415	𑌕	mu-pala	7-	important many	முப்பல
171	𑌕	nil-(v)anji, nilai	-	stable	நில்வஞ்சி, நிலை
?	𑌕	nal-inai, nāl-inai	-	good joining, joining four	நல்லிணை, நாலிணை
49	𑌕	kuṛumpu, kuḷampu	1844, 1829	chieftain (kuṛumba tribe)	குறும்பு, குளம்பு
51	𑌕	māru, mārru, mārrī, māran, iruvaṛi-māran-kuṛumpu	4834	barter, strong leader	மாறன், இருவழி-மாறன்-குறும்பன்
302	𑌕	mārral	4834	exchange	மாற்றல்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
129	∧	koḷ	2151	seize, acquire	கொள்
130	√	koḷal	2151	exchange, buy/sell	கொள்ளல், கொள்முதல்
148	卐	cērukoḷ	5297, 2151	exchange, buy/sell	சேர்ந்துகொள்
237	𑌵	mutal	4951	base, foot, stump	முதல்
238	𑌶	mutal-vaṇi	4951	eminent way	முதல்வழி
239	𑌷	mutal-ciṛa	4951, 2589	first eminent	முதல் சிற
304	𑌸	viḷ, viḷ	5422, 5421, 5432, 5433	bow, call out, sell	வில்
305	𑌹	viḷai	5437	productive, mature	விளை
127	𑌺	alaku, alanku, aṛagu	239, 240, 246, 255	beak, beauty, grains of paddy	அலகு, அழகு
306	𑌻	aṛaku-ṽilam	-	good home	அழகு ஈஇல்லம்
307	𑌼	viḷampu	5433, 5434	proclaim openly, serve food	விளம்பு
17	𑌽	villavaṇ	5422	archer	வில்லவன்
28	𑌾	viḷampan	5434	one who superintends the distribution	விளம்பன்
310	𑌿	vila-vila	5424	tremble with fear	விலவில
397	𑍀	aṇi, aṇiyal, maṇi-	116, 4672	jewel, pearl necklace	அணி, அணியல், மணி, முத்து மாலை
398	𑍁	peru-aṇi(yal)	116	big pearl necklace	பெரு அணி
377	𑍂	nal-aṇi-pala	-	many good pearl necklaces	நல் அணி பல
233	𑍃	mumalai	-	three mountain range	மும்மலை
235	𑍄	mumalai-vēl	-	three mountain hunter	மும்மலை வேல்
180	𑍅	koṭṭu, koṭṭam	2063, 2064, 2066	pour, sting	கொட்டு (தேன்), கொட்டம்
181	𑍆	koṭṭu	2063, 2064	pour, sting	கொட்டு
169	𑍇	nilam	3676	land, ricefield	நிலம்
171	𑍈	nilai	3675	firm, stable	நிலை
173	𑍉	irunilai	3675	very firm, stable	இருநிலை
174	𑍊	iru-nilam	481, 3676	great/vast land	இருநிலம்
88	𑍋	nal-iru	3610, 480	fine life	நல்லிரு

M77 Sign	Glyph	Syllable	DED	Description	Tamil
176	𑌵	vanjī, anjih, añcal	5265, 56, 54	paddy, rice, to take on shoulder, resting place	வஞ்சி, அஞ்சி, அஞ்சல்
166	𑌶	vēl-vanjī	-	hunter's lair	வேல்வஞ்சி
249	𑌷	māṭṭu	4801, 4802	fasten, put in, fasten, hook, kindle, fire	மாட்டு
253	𑌸	māṭṭal	4802	necklace	மாட்டல்
252	𑌹	mārram (māṭṭu + mu)	4834	exchange, barter	மாற்றம்
182	𑌺	iṭa-vaṛi-er	432/434, 3419, 903	guide, conduct, conduit	இடவழியேர்
178	𑌻	kalappai, kalam	1304	plough, vessel, ship	கலப்பை, கலம்
323	𑌼	il, ila	494, 497	non-existence, leaf	இல
325	𑌽	ila	497	leaf	இல
326	𑌾	ilai, ilai	497, 496, 513	leaf, young	இலை, இலஞ்சி
327	𑌿	iḷavarīan, iḷavarīan	-	horticulturalist?	இலைவழியான்
76	𑍀	cē, cēval	1931, 2818	red, bronze, cock	சே, செம்மை, சேவல்
311	𑍁	yār, eṛil	5156	harp, music, beauty	யாழ், எழில், இசை
400	𑍂	nuṛan	3714, 3715	penetrate, stitch	நுழ்-, நுழன், நுழம்பு, நுளம்பு
219	𑍃	tai (ta + kaccai)	3473	sew, stitch	தை
214	𑍄	irutai	481, 3473	strong stitch, good tailor	இருதை
?	𑍅	cī, cīpu, cil, calli	2599, 2622, 1577, 2382	cleanse, wooden peg, splinter	சீ, சிப்பு, சில்
240	𑍆	cil	1577	small	சில்
241	𑍇	cīra	2589	eminent, illustrious	சிற-
381	𑍈	cīrappu	2589	eminent, illustrious	சிறப்பு
256	𑍉	nērcīra	3772	just and eminent	நேர்கிற
266	𑍊	nērcīra-kō	2177	just and eminent leader	நேர்கிற கோ
215	𑍋	cīruta, cīruttai	2590	panther, leopard	சிறுத்த, சிறுத்தை
258	𑍌	cīrmai	2624	excellence, greatness	சீர்மை

M77 Sign	Glyph	Syllable	DED	Description	Tamil
257	𑌵	cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
259	𑌵	cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
192	𑌮	paḷli	4018	hamlet, herdsman's village	பள்ளி
193	𑌮	perum-puli	4307, 4411	big tiger	பெரும்புலி
321	𑌹	ñāṇ	2908	marriage string, necklace	நாண்
322	𑌹	nēññil	2907	plogh-shaft	நென்னில்
367	𑌹	nānan	2908	yarn maker	நாணன்
82	𑌺	tarupu	3142, 3169	to join together, amass (wealth)	தறுப்பு (தாரா - வாத்து)
247	𑌻	ciḷ-eṇal, ciḷu-ciḷ-eṇal	2588	noisy, bubbly	சிள்-எணல், சிளு-சிள்-எணல்
341	𑌼	uṛu	689	harrow	உழு (பரப்பு, பரம்பு)
177	𑌽	nal-mutal, nalāl	-	good chief, good worker, hard worker	நல்முதல், நல்லாள்
409	𑌾	nan-nil	3588	good standing	நன்னில்
365	𑌿	viri	5411	spread, expand, blossom	விரி
190	𑍀	pāḷaiyam	4117	army camp, village surrounded by hillocks	பாளையம்
189	𑍁	toṭṭi, tōṭṭi	3485, 3547	fence, rake	தொட்டி, தோட்டி
191	𑍁	toṭṭil	3486	cradle	தொட்டில்
202	𑍂	mēṭṭu, mēḍu, metta	5058, 5069	height, eminence, hillock, upper storey, storied house	மேட்டு, மேடு, மெத்த
203	𑍂	peru-mēṭṭu, peru-mēḍu, peru-metta	5058, 5069	height, eminence, hillock, upper storey, storied house	பெருமேட்டு, பெருமேடு, பெருமெத்த
188	𑍃	mett-eṇal	5070	gentleness	பெத்தெனல்
366	𑍄	utaḷ	610	goat	உதல்

Common phrases

Here we list multiple logos (mostly pairs and triplets) that commonly occur together in IVC. We also list a few non-aglutinative entangled glyphs which we try to describe them as complex mixed states.

M77 Signs	Glyph	Syllable	DED	Description	Tamil
321-336		uṭaṇ-ñāṇ	2908	marriage	உடன் நாண் (உடன்தை)
Sign-336 also has ideographic mortar & pestle marriage association as well					
176-321-336		uṭaṇ-ñāṇ-anjih	2908	marriage hall	உடன் நாண் அஞ்சி
148		maṛukoḷal, cērkoḷal	5297, 2151	barter, exchange, buy/sell	மாறுகொளல், சேர்ந்துகொளல்
12-124		ēr-vuṛavan	-	farmer	ஏர் உழவன்
169-124		ēr-nilam	-	farm land	ஏர் நிலம்
113		viḷai-nallam	5437- 3613	cultivable rich soil	விளை நல்லம்
130-51		maṛu-koḷal, iruvarī-māṛan- kuṛumpu-koḷal	-	barter	மாற்று கொளல், இருவழி-மாறன்- குறும்பன் கொளல்
402-267		koṭa-nāṭu	-	herder country	கொட நாடு
402-293		valaiyan-nāṭu	-	trapper's country	வலையன் நாடு
402-76		cē-nāṭu	-	red country, bronze country	சே நாடு
67-65		peru-kanni- kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
70-67		konda-kal	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
70-67-65		peru-konda-kal	-	big bullock cart	பெரு கோண்ட கல், பெரு மாட்டு வண்டி
176-307-379		pammu-vilambu- anji	-	bow stringer's resting place	பம்மு வில்லம்பு அஞ்சி
402-379-319		mura-pammu- nadu	-	yarn twisting country	முறபம்மு நாடு
342-379-398		perum.aṇi-	-	big necklace maker's town	பெரும் அணி பம்மூர்

M77 Signs	Glyph	Syllable	DED	Description	Tamil
		pammu-ūr			
372 = 342+400+ 397+162	𑌵 = 𑌵𑌶𑌷	vel-aṇi-nuṛan-ūr	-	town with hunters, pearl and cloth workers	வேல்திரள்நுழனூர்
194 = 342+400+ 397+162	𑌵𑌶 = 𑌵𑌶𑌷𑌸	mu-iru-mēl-per-ul	-	the mighty mēl-perul	மூவிரு மேல்பொருள்
96-409	𑌵𑌶𑌷 𑌵	nannilai (nannu-nil-ai)	3588	amiable	நன்னிலை
94-409	𑌵𑌶𑌷 𑌵	nanniral (nannu-niral)	3672, 3673	make orderly	நன்னிரல்
99-350	𑌵𑌶𑌷	vellālar	5507	agriculturalist	வெள்ளாளர்
315-108	𑌵𑌶𑌷𑌸𑌸𑌸	aṛu-kuṭi-ēru		river flooding houses	ஆறு குடிஏறு
87-89	𑌵𑌶𑌷	mura	5015	custom	முற, முறை
319-101	𑌵𑌶	mutal-mutal-muri	5010	first initial tender leaf	முதல் முதல் முறி
342-403-103	𑌵𑌶𑌷𑌸	īral-para-ūr	553	grief (death) messenger town	ஈறல் பறையூர்
328-222	𑌵𑌶𑌷	tāḍu, tallu	3156, 3105	butt with horns, gore, crush, beat	தாடு, தல்லு

260 Glyphs grouped under categories

A word of caution must be mentioned here that since these are primarily syllables, their actual use in a text may not correlate to below category.

Description	M77 Signs	Glyphs	Tamil
Activity-based countries	261, 391, 162, 245, 12, 326, 400, 311	𑌵, 𑌵, 𑌵, 𑌵, 𑌵, 𑌵, 𑌵, 𑌵	கோவன், பல்லவன், வலையன், தட்டான், உழவன், இலையன், நுழம்பன், பானன்
Farming: farmer, farm town	12, 15, 178, 124, 341	𑌵, 𑌵, 𑌵, 𑌵, 𑌵, 𑌵	உழவன், உழவூர், கலப்பை, ஏர், உழு
Horticulture: leaf, flower	326, 54	𑌵, 𑌵	செடி, பூ
Hunting: trapping, spear	35, 293, 162	𑌵, 𑌵, 𑌵	வலையன், வலையன், வேலன்
Cattle farming: herding and selling	261, 267, 30, 301,	𑌵, 𑌵, 𑌵, 𑌵	கோ, கோட்டை, கோவன், இடையன்
Carpentry and metallurgy: metal and wood work	245	𑌵	தட்டி (தட்டான்)

Description	M77 Signs	Glyphs	Tamil
Tayloring: stitching	400, 219, 182	𑌕, 𑌖, 𑌗	நுழல், தை, அணி
Honey gathering	180	𑌘	கொட்டு தேன்
Singing: harp, musician	311, 31	𑌙, 𑌚	யாழ், பாணன்
Trade: barter, buy/sell	51, 129, 130, 302, 148	𑌛, 𑌜, 𑌝, 𑌞, 𑌟	மாறன், மாற்று, கொள், கொள்ளல், மாற்றல், சேர்ந்துகொள்ளல்
Transportation: ship, boat, raft, manual cart, bullock cart, boat	59, 65, 70, 72, 67, 155	𑌠, 𑌡, 𑌢, 𑌣, 𑌤, 𑌥	கன்னி, பெருங்கன்னி, கல், கொல், கொண்ட, அம்பி
Movement: goods, send	153, 211	𑌦, 𑌧	பொருள்/பெருமுதல், அனுப்பு

Fish signs and it's varied manifestations

265 If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is “ka” and not “ma” or “mi”. We know that the fish sign is the most frequent in Indus script, so the obvious Turing’s not so enigmatic result is that the fish sign must start with “ka” and we found “kanni” is probably more feasible. However, our result “kanni” is independent of it and was inspired by M.V.Bhaskar’s interpretation (personal communication) that the “Garial” (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that “kanni” is a term used commonly in earlier times for boat or any vehicle. The analogy could be that “kanni” refering to a women carrying children or it could be that the boat itself was driven by women in those days. However, this analogy is not without it’s difficulty. The word “kaṇṇi” refered in modern Tamil to be a maiden is without any support in DED [1]. The only support comes the word “kaṇi” according to DED 1408 is “tender”, 270 “love”, “devotion” etc., and so is “kātal” DED 1445 - “love”, “affection”, “lust” etc. From not so mystical angle it could be just derived from “kaṇ” DED 1159 “eye”, “peacock’s tail”, probably leading to a mystical euphemism. Support from another quarter is “traveling places” come from DED 1443 “kāṇ” – “to see”, DED 1161 “kaṇ” – “place”, DED 1166 “kaṇai” - “arrow”, and DED 1109 “kaṭa” - “to move”. The interpretation that it is “kaṇṇi” is reinforced by other evidences like 280 sign-63 “kaṇṇi-pori”, where it is meant as a “snare” DED 1183+4538.

Assuming that sign-59 𑌠 is “kaṇṇi”, it could mean any of these things: vehicle, boat, cart, trap, trapper, soft, tender etc. We will show lines of text that seem to provide such evidences, but before that we decide a few variants of fish sign and phrases:

Standalone fish signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
59	𑌠	kaṇ, kaṇṇi	1408, 1109, 1183, 1159	boat, bamboo raft, soft, trapping	கண், கன்னி
72	𑌡	kōl	2238	boat, raft	கோல்
70	𑌢	kāl	1483	cart	கால்

65	𑌕	peru-kanni	-	big boat	பெருங்கன்னி
67	𑌕𑌕	kondū, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட

285 Fish sign phrases

M77 Signs	Glyph	Syllable	DED	Description	Tamil
67-65	𑌕𑌕	peru-kanni-kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
70-67	𑌕𑌕	kondā-kāl	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
70-67-65	𑌕𑌕𑌕	peru.kanni-kondā-kāl	-	big bullock cart	பெருகன்னி கொண்ட கல், பெரு மாட்டு வண்டி
72-67	𑌕𑌕	kondā-kōl	-	bullock raft?	கொண்டா கோல்
59-328	𑌕𑌕	u(ka)-kanni	559, 563	boat rising in waves	யுக கன்னி

Reading lines of text with fish sign

Sample line 1 (kanni = trapper)

𑌕 𑌕𑌕 𑌕 |

mutal-vilampan-mu.malai-kanni

முதல்-விலம்பன்-மும்மலை-கன்னி

Semantics:

290 Chief archer, an expert trapper of three mountains

Sample line 2 (kanni = transport vehicle)

↑ 𑌕 𑌕

nilai-kanni-anupu

நிலை-கன்னி-அனுப்பு

Semantics:

(Please) sends (goods) by a stable boat/raft/cart

Sample line 3 (kanni = boat/raft)

↑ 𑌕 𑌕 𑌕 𑌕 || 𑌕

palla-ar-iru-kanni-kōl-velan-ūr-anupu

பல்லர் இரு கன்னி: கோல் (மூலம்) வேலனார் அனுப்பு

295 **Semantics:**
Elephant town turthful kind man: sends (goods) by boat to hunter’s town

Agriculture and it’s related signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
12	𑌒	uṛavan	688	farmer	உழவன்
13	𑌓	uṛavāḷ	688	farm worker	உழவாள்
14	𑌔	per-uṛavan	688	big farmer	பேர் உழவன்
15	𑌕	uṛavūr	688	working, farming town	உழவூர்
112	𑌖	ñālam, nallam	2913, 3613	land, fertile black-soil	நாலம், நல்லம்
169	𑌗	nilam	3676	land, ricefield	நிலம்
169-112	𑌘	ñālam-nilam	2913-3676	fertile land, ricefield	நாலம் நிலம், நல்லம் நிலம்
113	(𑌙)	viḷai-ñālam	5437, 2913	cultivated land	விளை நாலம்
389	𑌚	pañ-nilam	3837	ploughed land	பண்ணிலம்
178	𑌛	kalappai	1304	plough	கலப்பை
124	𑌜	ēr	2815	plough	கலப்பை
341	𑌝	uṛu	689	harrow	உழு (பரப்பு, பரம்பு)
176	𑌞	vanji	5265, 56, 55	paddy, rice	வஞ்சி
412	𑌟	nāṇkuṛu	2906	earthworm	நாண்குழு

Franklin Southworth [6] work on connection between rice cultivation and Dravidian language shows how vanjī is related to rice:

300 “vari-(n)ci (with variants *vari, *varici, *varinci) ‘rice, paddy’ DED 5265 can be reconstructed for Proto-Peninsular Dravidian ... It is the source of the word for ‘paddy’—i.e., rice in the field or after harvesting and threshing, either husked or unhusked, but not yet cooked—in most of the modern Peninsular Dravidian languages. This word may be connected to the Elamite bar ‘seed’—though there is some doubt, as the phonetic correspondences are not regular. A related form, *ari-ci/ki, with
305 variants ari, arici, akki, arki (the last two ← *ariki) DED 215”

The Indus barter exchange system

We only illustrate the key points here. The local barter happens in the undocumented unorganized sector at the cross-roads (𑌞), in what is termed as “cantai” (சந்தை) in modern Tamil. The exchange is abstracted by the symbol 𑌞 and the barter mediated by 𑌟 (maran?), who is usually qualified by great reliable ancestary (flowery self-praise by the system). The exchange is done by symbol 𑌟 (kol, the dagger of exchange) and 𑌞 (an abstraction of the cross-road, 𑌞). Most of the script pertains to official barter transactions of Indus, which are really instructions of transporation mode and the origin/destination. The clitics like 𑌟 (M77-99) orchestrate the sentence structure of the lines of the seals. An highly compressed form of information exchange mechanism is enabled by the drsastic
315 use of poly-semantic logo-syllabic script with each of these logo-syllables having many semantic possibilities with high degree of pun. This is so deeply wedded to Indus culture and mode of

exchange that the deciphering of it has taken so long. The skills of bronze-age artisans is in full display here with those hundreds of poly-semantic logo-syllables crafted and designed with care to work in those small spaces available in the seals. What is interesting that the deeply mysterious swastic symbol (M77-148) is now understood as the mundane:

𐌶 = 𐌶+𐌶 = cērukoḷ = சேர்ந்துகொள்

i.e., declaration of an important exchange, which is usually followed by drum beats '𐌶'. The drum beats are also a way to invite more people to the square for exchange (at cross-roads).

Relative volume of trade

We consider the absolute occurrence numbers in the text and also the association to the right of sign no. 99 𐌶. If we assume that what precedes (to the right of) sign. 99 𐌶 is the sender of goods then we get the following data:

Glyph	Description	No. occurrences	Forward transactions
𐌶	Cattle	369	290
𐌶	Ivory	182	82
𐌶	Hunting and trapping	130	61
𐌶	Agriculture	225	18
𐌶	Honey	44	18
𐌶	Elephant herding?	15	10
𐌶	Cross-road	41	8
𐌶	Tailoring	14	4
𐌶	Jewellery	12	3

Among 634 occurrences in IVC text with sign no. 99, assuming that what comes to its right is the region that is sending commodities to the other regions, we can summarize that cattle and agriculture were the dominant activities, closely followed by carpentry and elephant-based products. Hunting, honey-gathering, fishing, carpentry, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC. Hunting, honey-gathering, fishing, carpentry, metallurgy, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC.

Class structure of IVC

It seems from the table above that the cattle herders had the dominant trade surplus and probably the agriculturists had the highest trade deficit. Sign-41 𐌶 kīrān (DED 1621) கீழான் refers to a poor person and studying his concordance we see that he is strongly associated with sign-137 𐌶 cēri (DED 207) சேரி, a place where many people assemble, associated in modern terms with the hut dwellments or slums in cities. It is quite surprising that this association has remained true for 5000

years! It is also noted that sign-41 𑌕 (kīrān) has atleast one association with all professions, except cattle herding (sign-267 𑌕). So it is clear that there is a class structure associated with IVC which puts cattle-herders (𑌕) at the top.

345 Praise heaped on the farmer

The barter system's accumulation of wealth by the ruling elite (sign-30 𑌕 "kovan"), accumulated in store-houses (sign-267 𑌕 "koṭṭa") necessitates a rhetoric of praise on the toiling farmer (sign-12 𑌕 "vuṛavan") like:

M77 signs	Glyphs	Syllable	Tamil	Description
12-75	𑌕 𑌕	peru.mu.kanni-vuṛavan	பெரும்மூக்கன்னி உழவன்	Enormously mature and soft farmer
12-2-86	𑌕 | 𑌕 |	mutal-kāvalan-vuṛavan	முதன்மை காவலன் உழவன்	First guardian farmer
12-325-86	𑌕 𑌕 |	mutal-ilai-vuṛavan	முன்னிலை உழவன்	The foremost farmer

- 350 Such eulogy of farmer and farming has continued even 2000 years after IVC culture in Thirukkural:
Kural 1031: Howe'er they roam, the world must follow still the plougher's team;
Kural 1032: The ploughers are the linch-pin of the world; they bear.

Frequency of adjectives of towns

Adjectives of towns	Syllable	Frequency	𑌕* Frequency	𑌕* Frequency	Description	Tamil
𑌕	nilam	225	47	18	land	நிலம்
𑌕	vēl	196	40	8	lance	வேல்
𑌕	nal-aran	168	114	0	good morals	நல் அறன்
𑌕	valaiyan	130	14	54	trapper	வலையன்
𑌕	vēl	117	112	0	hunter's town	வேலூர்
𑌕	vēlan	104	93	0	hunter	வேலன்
𑌕	arai	87	34	0	godown	அறை
𑌕	nal-vaṛi	87	44	1	cross-road	நால்வழி
𑌕	valai	80	37	7	net	வலை
𑌕	vari	35	32	0	road	வழி
𑌕	ce	32	32	0	bronze town	செம்பூர்
𑌕	peru-vaṛi	35	23	0	big road	பெருவழியூர்
𑌕	puli	25	21	0	tiger country	புலி
𑌕	tatti	134	70	6	smithy/carpenter	தட்டி
𑌕	er	78	16	0	plough	ஏர்
𑌕	iru-valai	51	28	0	strong net	இருவலை
𑌕	tai	129	40	9	tailor	தை
𑌕	ilai	32	18	0	horticulturist	இலை

Adjectives of towns	Syllable	Frequency	𑌵* Frequency	𑌶* Frequency	Description	Tamil
𑌵𑌶	vālai-kanni	13	12	0	fishing	கன்னி வலை
𑌵𑌶𑌶	nalnellal	61	14	8	good farmer	நல்லநெல்லாளர்
𑌵𑌶𑌶𑌶	vilai-nallam	17	15	0	fertile rich land	விளை நல்லம்
𑌵	mēl	56	14	2	uptown	மேல்
𑌵𑌶𑌶	mu.iru.mēl.pēr.ul	56	27	1	mighty uptown	மூவிருமேல் பொருள்

Other adjectives (praise) and their frequencies

Adjective	Syllable	Frequency	Description	Tamil
𑌵	nal-aran	168	good moral	நல் அறண்
𑌵𑌶𑌶	mu.iru.mēl.per.ul	56	mature-truthful-all-mighty	மூவிருமேல்பொருள்
𑌵	mutal	143	chief, foremost,	முதலாம், முதலவன்
𑌵	mū	300	mature	மூ-
𑌵	alaku	47	beauty, unperturbed	அழகு, அலங்கா
𑌵	nilai	130	firm, stable	நிலை
𑌵	iru-nilai	38	very firm, stable	இருநிலை

355

Postpositions and their frequencies

This is the equivalent of prepositions in English, but in Tamil they are post-positions and not prepositions.

M77 sign	Glyph	Frequency	Syllable	Description	Tamil
336	𑌵	229	utan	with, together, agreement	உடன்
99/100	𑌵	663	-ar	it's	-ஆர்
123	𑌵	189	-ar	it's	-ஆர்
97/98	𑌵	174	-il	-in	-இன்

360

Broad observations

One of the surprising observation in this decipherment is that almost no individual identities like personal names are found in the text. All trade transactions are from one collective identity like country, village/town to another country, village/town. Individuals are extolled within the collective identity of farmers, workers, etc. There are however, strong leadership role identities like chief “mutalvan”, “peru(m)-kanni”, “mu-velan”, “iru-velan” etc. It seems that there are store houses where the items are sent and dispersed through some social mechanism of distribution. It seems that the distribution process could be related to sign-37 𑌵 “vilampu” (DED 5434) and sign-28, 𑌵 “vilampan” seems more like the supervisor of distribution of goods. Sign-17 𑌵 (villavan, villōṇ)

365

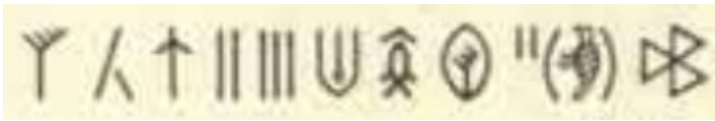
370 seems like another protection officer cader maintaining law and order. Probably the sign-176 𑀓
 “anjih” is a place each of the specialized workers like tailors, jewellery makers, carpenters, bronze
 workers, ivory workers, with each having a separate specialization location in town where others
 can reach them as targets for exchange. This tradition continues in many town in India even now,
 although in rapid decline with the arrival of multispeciality supermarkets.

Semantic reading

375 The whole exercise of decipherment will be meaningless gibberish if it doesn’t lead to any to proper
 semantic outcomes. We have already seen a range of professions, towns and trade symbols that we
 are able derive from the excercise. We will now read a few lines using the above syllabary that we
 have declared.

1. M77 Line 1006-100101

380



NFM font equivalent rendering:

385 𑀓𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓 𑀕𑀸𑀓

Very clever trapper velappan of the triple mountain: sends by boat along the big river with care to
 the tiller of land

பறவைகளை வேட்டையாடி விற்க்கும் மும்மலையார் வேலப்பன்: பெருங்கண்ணி உடன் முன்னிருந்து
 அம்பி (படகு) ஏர் உழும் நிலத்துக்கு)

390 The break-up steps:

𑀕𑀸𑀓: valai-puri (வலை-புரி) mu-malai-ar (மும்மலை-யார்)

𑀕𑀸𑀓: velappa (வேலப்ப)

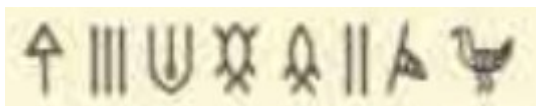
𑀕𑀸𑀓: peru-kaṇ-uṭan (பெருங்கண் உடன்)

𑀕𑀸𑀓: mu-iru (மு-இரு)

395 𑀕𑀸𑀓: ambi (அம்பி)

𑀕𑀸𑀓: ēr-nilam (ஏர் நிலம்)

2. M77 Line 1008-100101



400 NFM font equivalent rendering:

△|||UXX-Ų||ḥḥ

Bronze countryman: sends by bullock-cart to triple mountain

சேவல் நாட்டார்: மாட்டு வண்டி உடன் மும்மலை(க்கு) அனுப்பு(கிறார்)

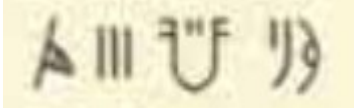
The break-up steps:

405 ||ḥḥ: cēval-natt-ar (சேவல் நாட்டார்)

UXŲ: kanni-konṭa-uṭan (கன்னி கொண்ட உடன்)

△||: mu-anupu (மூ-அனுப்பு)

3. M77 Line 1029-100101



410 NFM font equivalent rendering:

△|||U'ḥḥ)

Hunter/trapper townsman's three-mountain country

வேட்டையாடி வலை பிடிக்கும் ஊர் மும்மலை நாடு

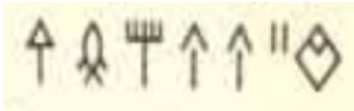
The break-up steps:

415 'ḥḥ: valai-an-in (வலையனின்)

U': ur-ār (ஊரார்)

△||: mu-nāṭu (மூநாடு)

4. M77 Line 1032-100101



420

NFM font equivalent rendering:

△ŲU'△△"ḥ

Cattle country: prized goods sent by stable boat

கோட்டுரார்: பெருமுதல் பொருள் நிலை கன்னியில் அனுப்பு(கிறார்)

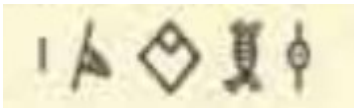
425 The break-up steps:

"ḥ: koṭ-ūr (கோட்டுரார்)

△△: peru.mutal-porul (பெருமுதல் பொருள்)

△ŲU: nilai-kanni-anuppu (நிலை கன்னி அனுப்பு)

5. M77 Line 1067-100101



430

NFM font equivalent rendering:



The pearl necklaces are being bartered in cattle country
அணியல் மாற்றம் கொட நாட்டில்

435 The break-up steps:

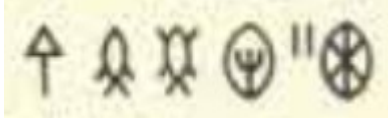
†: aṇiyal (அணியல்)

✦: marṛam (மாற்றம்)

┘/◇: koda-nāṭu-il (கொடநாட்டில்)

6. M77 Line 1088-100101

440



NFM font equivalent rendering:



Elephant country velappan: sends by bullock cart

445 பல்லார் வேலப்பன்: மாட்டு வண்டியில் அனுப்பு(கிறார்)

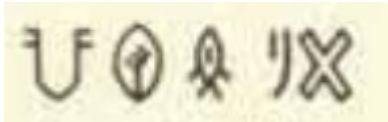
The break-up steps:

◡┘⊗: palla-ar-velappa (பல்லார் வேலப்பன்)

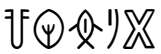
✦✦: konde-kanni (கொண்டே கன்னி)

△: anuppu (அனுப்பு)

450 7. M77 Line 1095-100101



NFM font equivalent rendering:



Cross-roads countryman sends cart to velappa town

455 நால்வழியார் வண்டி வேலப்ப ஊர்(க்கு)

The break-up steps:

┘✦: nal-vaṛi (நால்வழியில்)

✦: kāl (கால்)

┘◡: velappa-ur (வேலப்ப ஊர்)

460 Pluripotency

The fish sign-59 ✦ kanni takes the values of boat, craft, vehicle, bullock cart in these cases. We have also observed that in some other case:



465 that the sign-59 ೀ kanni takes the value of “trapper” or “trapping”.

From these readings we also obtained:

ampu ≈ anuppu ≈ ambi

kondā ≈ konda



470 The syllables not only took different semantic values from the standalone values but they also took a deformed phonemic values, a key aspect of Indus writing system that enables pluripotency in both form and content in order increase coverage with only a few signs, thus increasing literacy.






Further readings





475 The above section considered just seven sentences in IVC text, but there are several thousand lines of text in M77 [2] and we will be pursuing deciphering them over time. Few pages have already been deciphered from the lines of text available in Mahadevan’s work [2]. The results will be reported in online version tracking system, as and when we decipher them [7].



Graphics and text: a show and tell

In this document we decipher the text embedded along with illustrated scene in some of the IVC tablets. We have selected only the ones that have certain dramatic element in it.

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate V - 98		𑀮𑀺𑀭𑀺𑀭𑀺	tāḍu/tallu-utai	butt/crush-kick	தாடு/தல்லு உதை
Plate V - 103		𑀮𑀺𑀭𑀺𑀭𑀺	ceru-koṭṭu-tālume-iru	stop-fight	செருக்கொட்டு தாளும்-இரு

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate V - 105		↑𑌕𑌃𑌃𑌃	iru-vilagu- ar-kanni- anuppu	prevent fighting by sending guard	இரு-விலக்கார்- கன்னி-அனுப்பு
Plate VI - 114		𑌕𑌃𑌃𑌃𑌃𑌃	mu-tāri-tai- koḷ-ūr-an	accept ancestral power transfer	மூதாழிதை கொள் ஊரான்
Plate IV - 80		𑌕𑌃𑌃𑌃𑌃𑌃	nal.vaṛi-yar- velan-kal- aru-ūr	Controller of cross-way Velan sending boat along the river in the town	நால்வழியார் வேலன் கல் ஆற்றுநர்
Plate IV - 81		𑌕𑌃𑌃𑌃𑌃𑌃	tan-taṛi- mu.ūr-kanni- ūr	Controller of many country transactions	தன்தாழி வேலப்ப முஞர் கன்னியூர்
Plate III - 55		𑌕𑌃𑌃𑌃𑌃𑌃	palla.kotta- ar-velan- kanni- anuppu-māṭi	Unity of seven (3+2+ 2) nation's Velan (controlling bureaucrat?): Elephant fort sending by	பல்லர் கோட்ட வேலன் கன்னி அனுப்பு மாடி/மாடு

M77	Graphics	Glyphs	Syllables	Description	Tamil
				vehicle to buffalo country	
Plate III - 54		𑌕𑌣𑌆𑌔𑌕𑌔𑌕𑌔𑌕𑌔𑌕𑌔	anjih.an- ūr-ar-mēl-konda-ūr-an	Five-cross-way multi-storeyed rest-house for travellers	அஞ்சியன் ஊரார் மேல் கொண்ட ஊரான்
Plate III - 57		𑌕𑌔	mu-puli(malai)-velan-eṟuvanji	Three-mountain tiger country excellent rest-house for hunters	மும்புலி வேலன் எழுவஞ்சி
Plate III - 50		𑌕𑌔𑌕𑌔𑌕𑌔𑌕𑌔𑌕𑌔𑌕𑌔	muvan-eṟuvanji-yar-ēr-ūr	Rhino country seal: Three-mountain rest-house to tiller's land	வலன் மூவன் வஞ்சியார்: ஏர் ஊர்
Plate III - 51		𑌕𑌔𑌕𑌔𑌕𑌔	palla-ar-māṭṭu-vel-ūr	Markhor country seal: Elephant country loads to hunter's town	பல்லர் மாட்டு வேலூர்

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate I - 18		புலையு	koṭa-ar-konda-para-iru-ūr	Elephant country (food): Cattle herder sending by bullock to messenger's town	கோட்டார்: கொண்ட பறையர் ஊர்
Line 1093		புலையு புலையு புலையு	konda ūr-tarupu-ūr velūr-ūr	Gathering of buffalo townsmen at Velūr town	கொண்ட ஊர் தறுப்பூர் வேலூர் ஊர்

480 Major countries depicted by animals in seals

This is another major category that is directly indicated by animals.

Plate III -55 [2]

485



Here we can see five major countries indicated branching from two unicorn motifs and here with two of them further branching into two subcategories.

490 The seal on the right is either calling for (or celebrating) bartering between five countries:

பு || ஐ (para-ar-ūr, பறையூர்)

calling for five nations to join in the barter system

சுசுசுசுசு

(cērukoḷ, சேர்ந்துகொள்)

495 The animals that seem to indicate the five nations [4] in the seals are:

Markhor/Gaur (bison) ◇, Buffalo □, Elephant ⊕, Rhino ? and Tiger ✕.

Although all the skills and specialised skill centers (vanjih, 𑀓𑀲) are all distributed all over the towns and villages of all countries, in triple mountain tiger country (Afghanistan?) there seems to be preponderance of hunters, animal trappers and honey collectors.

500 **A brief summary of the of the IVC writing system**

The IVC system can be considered as a resolution of the contradiction arising between pure ideographic and pure syllabic system of writing. We were able to associate unique syllabic value to every sign. Although the ideographic system allows easy understanding of the base signs through a Dravidian root-word association, they also create a complex plethora of signs for the IVC writer to recognize and use. In order to reduce the number of signs needed, a pure syllable-based number system seems to have been used, which is affixed/prefixed/welded to the base sign to produce agglutination of word-pieces. The core consonant backbone of the base is maintained in the agglutination process, but the affixes may retain only the front/middle/tail syllable, depending on whether it is affixed/infixed/prefixed, respectively. Although each sign signifies a syllable and not a concept or idea, an ideographic undercurrent remains strong throughout the IVC writing system, creating certain stability of the semantics of the writing system. It is also observed that certain amount of arbitrariness is allowed during the agglutination process: deletion, modification or addition of vowels/glides. Glides are soft consonants that are added as binders for smooth phonetic transition between hard consonants. For proper understanding of practical Tamil grammar as it is spoken now one can consult Harold F. Schiffman [8], but one must not apply these grammar rules blindly to the IVC writing system, as 5000 years separate the present Dravidian languages and the IVC languages.

Overlap with previous work

No work germinates on it's own; it usually germinates on a fertile ground laid down by others. There were many conjectures on this Indus writing system by Asko Parbola, Iravatham Mahadevan and Brian Wells. I will briefly outline some of them pointing out overlaps and differences. It all started with the interpretation for fish sign as "mīn" by father Heras in 1930s [9]. This was reiterated with caution by Iravatham Mahadevan [10]. If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is "ka" and not "ma" or "mi". We know that the fish sign is the most frequent in Indus script, so the obvious Turing's not so enigmatic result is that the fish sign must start with "ka" and we found "kanni" is probably more feasible. However, our result is independent of it and was inspired by M.V.Bhaskar's interpretation (personal communication) that the "Garial" (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that "kanni" is a term used commonly in earlier times for boat or any vehicle. This was probably dropped later on in Tamil literature. The same however continues in Indo-European tradition that associates feminine gender to even a modern vehicle like train inflecting verb appropriately.

There were many interpretations by Asko Parbola and Mahadevan [11] on the M77 sign-342 𑀓𑀲, including "-an". MVB was quite critical of this being male-centric, an apt criticism, as he found no preponderance of male domination in IVC art. The interpretation of sign-1 𑀓𑀲 as "-an" has also been proposed by Bryan Wells [3] and then MVB's criticism can be cleverly overcome by stating that "-an/-al" could have been sex-neutral term in those days and associating "-al" with feminine gender could have been a later invention by the male-dominant society (especially as "-al" has connotation

with darkness and evil). On other proposals of Iravadham Mahadevan and Bryan Wells's on numbers as being semantically numbers, we found no parallels in our interpretations. In fact, the numbers are probably the only signs that almost never reflected their standalone ideographic value. This was indeed quite surprising for us, as we found almost no evidence for this. MVB has been quite radical in this interpretation, proposing that almost a new syllabic system can be conjured-up using just the numbers alone.

Yuri Knorozov [12] has also done extensive study of the IVC writing system and he has correctly identified numbers as syllables, with sign-86 | identified as "or", || as "iru", ||| as "mu", |||| as "nal", ||||| as "ai". This is exactly as what we have deciphered here, although we consider sign-86 | as "mutal" and not "or".

Bryan Wells's work also proposes other possibilities like sign-358 𑀓 being closely related to the Hare's ears and so proposing the syllable "ce" from "cevia". The author is in full agreement with this proposal and in fact, both this and sign-76 𑀓 also evokes the same "ce" syllables. In the IVC context of bronze-age, these have semantic connotations to "cembu" (bronze). Bryan Wells also proposed "kō" for sign-261 𑀓 and "kōṭa" for sign-267 𑀓. We are fully in agreement with these readings.

Ansumali Mukhopadhyay [13] studied the word for teeth, "pa l la" and it's relationship to the ivory trade. The sign-391 𑀓 is here deciphered as "pa l la", the elephant, an important sign in the IVC, especially in relationship to the ivory trade. There could have been many more proposals that may have some overlap with our interpretations here. We would be glad to include them in our document as soon as we are made aware of them.

Farmer et al. [14] criticism that the average number of signs in a line are two short (on the average of between 4 and 5 signs) for any meaningful orchestration of a writing system is quite correct. However, our decipherment points out that these lines of text are mostly **from/to** addresses with mode of transport indicated through fish and arrow signs in-between the **from** and **to** addresses. Sometimes the mode of transport is left out (or is implied) and the same could be true of the **to** address, which probably is implied from the context. There are also very short lines heaping praise on towns and their workers. In any case, writing in crisp and short messages is a tradition that has continued for a long-time in Dravidian tradition, as established in Thirukkural, which is taught even now in schools of Tamilnadu.

Conclusions

First important study of the Dravidian family of languages was by Caldwell [15] in 1886. Recent studies indicate that the temporal origin of proto-Dravidian to be around 2500 BCE [16, 17], so it can be discerned that the Indus script could have been a major epicenter for the formation of the identity of Dravidian language family. We can even go ahead and conjecture that some aspects of Dravidian linguistic structure could have been a result of remoulding of languages of the Indus Valley Civilization into an agglutinative reformulation as constrained and evolved by the Indus script. After the gradual decay of IVC, with southern migration of the population, the language could have radiated into the many branches of Dravidian family [16]. A detailed study of the decipherment and it's relationship to Dravidian morphology could provide further clarity on this feasibility.

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580 The decipherment became possible with the arrival of the splendid work by MVB [4]. This laid down the map that lead to all the linkage between graphics and the text, building this beautiful journey of discovery enabled by M.V. Bhaskar, with whom I have been working for the past several years. My learning in art, Brahmi and Indus Script derived from his interactions. Of course, all this work could not have been possible without the enormous efforts of Asko Parbola, Iravadham
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590 Partial funding was received from TNQ Foundation, Chennai while completing this work. All data required to access the scientific veracity of the work is available through the references cited at the end of the text and through the open web portal: <https://github.com/Sukii/decipher-ivc>. Any other data or references cited can be provided on request.

Conflict of interest

Author would like to state that there is no conflict of interest in this paper.

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